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MCF5216

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MCF5216 : Integrated ColdFire Version 2 Microcontroller

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The MCF5216 addresses the growing demand for 32-bit microcontrollers at a lower cost and expands Freescale Semiconductor's 32-bit Flash-based ColdFire MCU family. The MCF5216 provides an upgrade for current MMC2107, MMC2113 and MMC2114 users who require more Flash and/or higher performance. The MCF5216 provides a richer set of the same peripheral mix while standardizing on one low-cost, low-power MCU family with a wide range of third-party support.

The MCF5216 cost-effectively integrates digital and analog peripherals with RAM, embedded FLASH memory, and a 32-bit ColdFire core on a single-chip. The MCF5216 includes a QADC, QSPI and CAN for industrial control, security and other control-oriented applications.

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MCF5216 Features

- V2 ColdFire core delivering 63 (Dhrystone 2.1) MIPS at 66 MHz running from Cache/RAM (max running from internal flash 54 MIPS)
- 512KB embedded flash memory
- Enhanced Multiply-Accumulate Unit (eMAC) for DSP functionality
- 64 Kbytes of static RAM
- Cache for external access support
- Address decode and chip selects
- CAN 2.0B controller area network interface with 16 message buffers
- Three UARTs with DMA capability
- Queued serial peripheral interface (QSPI) with four peripheral chip selects
- 8-channel 10-bit queued analog-to-digital converter (QADC)
- Four 32-bit timers with capture, compare and DMA capability
- Eight 16-bit timer channels for capture, compare, and pulse width modulation
- Four periodic interrupt timers (PITs)
- I2C bus controller
- JTAG for board testing
- BDM for debug, including real-time trace
- 17 mm x 17 mm x 1.6 mm 256-ball MAPBGA package
- Operation at 66MHz from -40C to +85C
- Metrowerks CodeWarrior support
- Extensive third party tools and software support

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MCF5216 Parametrics

CPU Performance (Max) (MIPS)	Operating Frequency (Max) (MHz)	Ambient Operating Temperature (Min) (oC)	Ambient Operating Temperature (Max) (oC)	Core Operating Voltage (Spec) (V)	I/O Operating Voltage (Max) (V)	GPIO Pins	Internal RAM (Byte)
54	66	-40	85	3.3	5	142	64000

Serial Interface		Other Peripherals
Type	Number of Interfaces	
FlexCAN, I2C, QSPI, UART	1, 3	512KB Flash, DMA Controller, EMAC, Interrupt Controller, JTAG, PLL, Watchdog Timer

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MCF5216 Documentation**Documentation****Application Notes**

ID and Description	Vendor ID	Format	Size K	Rev #	Date Last Modified
<u>AN2168</u> AN2168 ColdFire Microprocessor DMA Controller Application Note	FREESCALE	pdf	791	0	1/31/2001
<u>AN1766</u> Using the SDRAM Controller on the MCF5307 ColdFire Integrated Processor Application Note	FREESCALE	pdf	428	2.0	3/12/1999

Brochures

ID and Description	Vendor ID	Format	Size K	Rev #	Date Last Modified
<u>BRCOLDFIRESUM</u> ColdFire Product Summary Guide	FREESCALE	pdf	165	2	4/24/2006
<u>COLDFIRE_OVERVIEW</u> ColdFire Family Overview Brochure	FREESCALE	pdf	6925	2	3/20/2006

Errata - [Click here for important errata information](#)

ID and Description	Vendor ID	Format	Size K	Rev #	Date Last Modified
<u>MCF5216DE</u> MCF5216 Integrated Microcontroller Device Errata (Supports MCF5214)	FREESCALE	pdf	451	1.7	9/28/2004

Product Briefs

ID and Description	Vendor ID	Format	Size K	Rev #	Date Last Modified
<u>MCF5216PB</u> MCF5216 Integrated Microcontroller Product Brief	FREESCALE	pdf	717	0	3/29/2004

Reference Manuals

ID and Description	Vendor ID	Format	Size K	Rev #	Date Last Modified
 					 
CFLMOPM Library of Macros for Optimization Using eMAC and MAC Programmer's Manual	FREESCALE	pdf	477	1	10/24/2005
CFLMOPMSW Software for the Library of Macros for Optimization Using eMAC and MAC Programmer's Manual	FREESCALE	zip	55	0	10/24/2005
CFPRM ColdFire Family Programmer's Reference Manual	FREESCALE	pdf	1666	3	3/08/2005
DSPLIBUM Digital Signal Processing Libraries Using the ColdFire eMAC and MAC	FREESCALE	pdf	294	1.2	3/13/2006
DSPLIBUMSW "Digital Signal Processing Libraries Using the ColdFire eMAC and MAC User's Manual" Software	FREESCALE	zip	1007	0	5/18/2006
MCF5216UM MCF5216 ColdFire Microcontroller User's Manual	FREESCALE	pdf	6729	0	3/29/2004

White Papers

ID and Description	Vendor ID	Format	Size K	Rev #	Date Last Modified
MCF5XXDBWP MCF5XXDBWP Debug Support on the ColdFire Architecture	FREESCALE	pdf	215	0	1/01/1999

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MCF5216 Design Tools**Hardware Tools****Emulators/Probes/Wigglers**

ID and Description	Vendor ID	Format	Size K	Rev #	Availability
ADV-BDM-CF Advanced BDM Adaptor The Cybertec Advanced BDM PC Parallel Port Adaptor provides an inexpensive means of connecting the Background Debug Mode (BDM) interface of a variety of Freescale ColdFire microprocessors (5206e, 52xx series, 53xx series and 54xx series)	CYBERTEC	-	-	-	-
CABLE_CFLV CABLE_CFLV P&E's Shielded ColdFire Interface Cable provides access to the Background Debug Mode (BDM) on Freescale ColdFire microcontroller. It is the hardware interface between a standard IBM PC parallel port and a standard 26 pin connector.	PEMICRO	-	-	-	-
PKGCFZ-USB PKGCFZ-USB The ColdFire BDM Development Package (USB Interface And Software) is a powerful, inexpensive, Windows-based development suite for Freescale's MCF52xx/53xx/54xx microcontrollers. Produce ColdFire applications and debug your applications.	PEMICRO	-	-	-	-
PROBE Green Hills Probe & Slingshot High speed on-chip download and run control.	GREENHILLS	-	-	-	-
WRICE Wind River ICE The Wind River ICE is a JTAG hardware run control device that supports multiple JTAG, EJTAG, and BDM devices on a single scan chain. It can support connections for up to eight devices simultaneously in a scan chain of up to 128 JTAG devices.	WINDRIV	-	-	-	-

Evaluation/Development Boards and Systems

ID and Description	Vendor ID	Format	Size K	Rev #	Availability
M5282EVB	FREESCALE	-	-	-	Buy Direct
M5282EVB Evaluation Board supporting MCF5282/81/80/16/14					Distributor

Models**BSDL**

ID and Description	Vendor ID	Format	Size K	Rev #	Availability
MCF5216BSDL	FREESCALE	zip	10	1.2	Download
MCF5216 BSDL					

Programmers

ID and Description	Vendor ID	Format	Size K	Rev #	Availability
CYCLONE MAX	PEMICRO	-	-	-	-
CYCLONE MAX A stand-alone programmer and hardware debug interface for ColdFire, PowerPC, and ARM, the Cyclone Max is an extremely flexible tool designed for Flash Programming, Debugging, and Testing of microprocessor based systems.					
CYCLONEMAX	PEMICRO	-	-	-	-
Cyclone Max High-speed, low-cost, in-circuit programming of Freescale ColdFire and PowerPC based systems. Stand-alone or host-controlled operation. USB, serial, 10/100 ethernet, and 1.8v-5.0v target support. Programs internal and external flash.					

Software**Application Software****Code Examples**

ID and Description	Vendor ID	Format	Size K	Rev #	Availability
M5282EVBDEBUG	FREESCALE	zip	580	v3a.1a.1b	Download
M5282EVB dBUG source files					
MCF5282I2C	FREESCALE	zip	126	2.0	Download
MCF5282 I2C example code					
MCF5282SC	FREESCALE	zip	97	1c	Download
MCF5282/MCF5280 processor initialization template, header files, and software examples updated revision to include TFTP example and CodeWarrior projects for internal flash					
RAM CACHE TEST	FREESCALE	zip	1856	1.1	Download
MCF528x and MCF5216/14 SRAM and cache test code					

Board Support Packages

ID and Description	Vendor ID	Format	Size K	Rev #	Availability
INTEGRITY/VELOCITY/MULTI BSP	GREENHILLS	-	-	-	-
Green Hills BSP The Green Hills BSP provides INTEGRITY & veLOsity RTOSes and MULTI debugger for board- specific cross development through the Green Hills Probe, Slingshot or P&E Wiggler or, if no board is available, to the MULTI instruction set simulator.					

Operating Systems

ID and Description	Vendor ID	Format	Size K	Rev #	Availability
ARC-MQX-RTOS					
MQX RTOS MQX RTOS provides proven performance, with blazing real-time speed within a tiny footprint. MQX RTOS is designed to be easy to configure to balance code size with performance requirements.	<u>MQX</u>	-	-	-	-
 CMX00215 CMX-RTX	<u>CMX</u>	-	-	-	Buy Direct
 CMX00215A CMXKAware	<u>CMX</u>	-	-	-	-
CMX00305 CMX TCP/IP CMX TCP/IP is a full-featured and fast TCP/IP stack that allows designers to offer networking connectivity for their embedded applications. CMX TCP/IP offers a low licensing fee, full source code, no royalties, and free technical support.	<u>CMX</u>	-	-	-	-
CMX00305B TCP/IP DHCP Server The CMX TCP/IP DHCP Server Add-On Option provides CMX TCP/IP (see CMX00300, CMX00305, or CMX00310) with functionality to support the Dynamic Host Configuration Protocol standard. A source code example is provided for fast design start up.	<u>CMX</u>	-	-	-	-
CMX00305C TCP/IP FTP C/S The CMX TCP/IP FTP Client/Server Add-On Option provides CMX TCP/IP (see CMX00300, CMX00305, or CMX00310) with functionality to support the File Transfer Protocol standard. A source code example is provided for fast design start up.	<u>CMX</u>	-	-	-	-
CMX00305E TCP/IP NAT The CMX TCP/IP NAT Add-On Option provides CMX TCP/IP (see CMX00300, CMX00305, or CMX00310) with functionality to add Network Address Translation function to a network application. Source code example provided for fast design start up.	<u>CMX</u>	-	-	-	-
CMX00305F TCP/IP POP3 The CMX TCP/IP POP3 Client Add-On Option provides CMX TCP/IP (see CMX00300, CMX00305, or CMX00310) with functionality to support the Post Office Protocol Client standard. A source code example is provided for fast design start up.	<u>CMX</u>	-	-	-	-
CMX00305G TCP/IP PPP The CMX TCP/IP PPP Add-On Option provides CMX TCP/IP (see CMX00300, CMX00305, or CMX00310) with functionality to support the Point to Point Protocol serial or modem connectivity standard. Source code example provided for fast start up.	<u>CMX</u>	-	-	-	-
CMX00305H TCP/IP PPPoE The CMX TCP/IP PPPoE Add-On Option provides CMX TCP/IP (see CMX00300, CMX00305, or CMX00310) with functionality to support the Point to Point Protocol over Ethernet standard. A source code example is provided for fast design start up.	<u>CMX</u>	-	-	-	-
CMX00305I TCP/IP SMTP The CMX TCP/IP SMTP Client Add-On Option provides CMX TCP/IP (see CMX00300, CMX00305, or CMX00310) with functionality to support the Simple Mail Transfer Protocol standard. A source code example is provided for fast design start up.	<u>CMX</u>	-	-	-	-
CMX00305J TCP/IP SNMP The CMX TCP/IP SNMP V1 and V2c Add-On Option provides CMX TCP/IP (see CMX00300, CMX00305, or CMX00310) with functionality to support the Simple Network Management Protocol standard. Source code example provided for fast design start up.	<u>CMX</u>	-	-	-	-

CMX00305L

TCP/IP Telnet

The CMX TCP/IP TFTP Client/Server Add-On Option provides CMX TCP/IP (see CMX00300, CMX00305, or CMX00310) with functionality to support the Trivial File Transfer Protocol Client/Server standard. Source code example for fast start up.

CMX

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CMX00305M

TCP/IP Web Client

The CMX TCP/IP Web Client/Server Add-On Option provides CMX TCP/IP (see CMX00300, CMX00305, or CMX00310) with functionality to support the Hyper Text Transfer Protocol (HTTP) Web Client/Server standard. Source code example provided.

CMX

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CMX00305N

TCP/IP Web Server

The CMX TCP/IP Web Server Add-On Option provides CMX TCP/IP (see CMX00300, CMX00305, or CMX00310) with functionality to support the Hyper Text Transfer Protocol (HTTP) Web Server standard. Source code example provided for fast start up.

CMX

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CMX00610

CMX-FFS

CMX-FFS is a very small, standard Flash File System that allows designers to offer file system functionality for their embedded applications. CMX-FFS offers a low licensing fee, full source code, no royalties, and free technical support.

CMX

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SMXCF

SMX Modular RTOS for ColdFire

smxCF is designed for the ColdFire processor family. It features hard real-time multitasking, networking, file management, USB, user interface, and full support for Metrowerks CodeWarrior.

MICRODIG

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uC/OS-II

uC/OS-II

uC/OS-II, The Real-Time Kernel is a highly portable, ROMable, very scalable, preemptive real-time, multitasking kernel for microprocessors. uC/OS-II can manage up to 63 application tasks. uC/OS-II is certifiable for avionics & medical use

MICRIUM

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Programmers**ID and Description****Vendor ID****Format****Size K****Rev #****Availability****CFFLASHER**

CFFlasher 3.1

A free flash programming utility for Freescale ColdFire evaluation boards.

FREESCALE

zip

4377

3.1.1

[Download](#)**PROGCFZ PRO USB**

PROGCFZ PRO USB

The PROGCFZ PRO ColdFire Flash/EEPROM Programmer is a Windows BDM Programmer allows you to program/reprogram external flash devices in-circuit, via one of P&E's hardware interfaces, to give the user access to all on-chip resources.

PEMICRO

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Protocol Stacks**ID and Description****Vendor ID****Format****Size K****Rev #****Availability****SSH_SERVER**

Embedded SSH Server

MOCANA SSH SERVER: Supports Freescale chipsets out of the box. Small (70KB), fast, trusted. FIPS Cryptos. Supports all major cryptos. Royalty free, source code license. FREE EVAL: <http://www.mocana.com/fsevaluate.html>

MOCANA

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SSL_CLIENT

Embedded SSL/TLS Client

MOCANA SSL/TLS CLIENT: Supports Freescale chipsets out of the box. Small (65KB), fast, trusted. FIPS crypto. Supports all major cryptos. Royalty free, source code license. FREE EVAL: <http://www.mocana.com/fsevaluate.html>

MOCANA

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SSL_SERVER

Embedded SSL/TLS Server

MOCANA SSL/TLS SERVER: Supports Freescale chipsets out of the box. Small (50KB), fast, trusted. FIPS cryptos. Supports all major cryptos. Royalty free, source code license. FREE EVAL: <http://www.mocana.com/fsevaluate.html>

MOCANA

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UC/TCP-IP**uC/TCP-IP**

uC/TCP-IP is a compact, reliable, high performance TCP/IP protocol stack. Built from the ground up with Micrium's renowned quality, scalability and reliability, uC/TCP-IP enables the rapid configuration of required network options.

MICRIUM

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Software Tools**Compilers****ID and Description****Vendor ID****Format****Size K****Rev #****Availability****COMPILER**

C/C++ Compiler

Optimizing C, C++, EC++ compilers for Freescale PowerPC, ColdFire, StarCore, 68K, MCore and ARM-based MAC architectures.

GREENHILLS

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CWS-MCF-LLPLT-CX

CodeWarrior Development Studio ColdFire ISA, Linux Platform Edition

FREESCALE

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[Buy Direct](#)
[Distributor](#)
CWS-MCF-STDED-CX

CodeWarrior Development Studio for ColdFire Architectures, Standard Edition

FREESCALE

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[Buy Direct](#)
[Distributor](#)
Debuggers**ID and Description****Vendor ID****Format****Size K****Rev #****Availability****CWS-MCF-LLPLT-CX**

CodeWarrior Development Studio ColdFire ISA, Linux Platform Edition

FREESCALE

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[Buy Direct](#)
[Distributor](#)
CWS-MCF-STDED-CX

CodeWarrior Development Studio for ColdFire Architectures, Standard Edition

FREESCALE

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[Buy Direct](#)
[Distributor](#)
ICDCFZ

ICDCFZ

P&E's ICDCFZ for Windows is a powerful ColdFire In-Circuit Debugger. It uses the processor's background debug mode (BDM), via one of P&E's hardware interfaces, to give the user access to all on-chip resources.

PEMICRO

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IDE (Integrated Development Environment)**ID and Description****Vendor ID****Format****Size K****Rev #****Availability****CROSSFIRE-LINUX**

CrossFire Tools

The CrossFire Tools are a low cost, easy to install, C/C++ development environment for the Freescale ColdFire family of Microprocessors. Based on GNU compiler tools, CrossFire Tools are available in both Windows and Linux versions

CYBERTEC

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CROSSFIRE-WIN

CrossFire Tools

The CrossFire Tools are a low cost, easy to install, C/C++ development environment for the Freescale ColdFire family of Microprocessors. Based on GNU compiler tools, CrossFire Tools are available in both Windows and Linux versions

CYBERTEC

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CWS-MCF-LLPLT-CX

CodeWarrior Development Studio ColdFire ISA, Linux Platform Edition

FREESCALE

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[Buy Direct](#)
[Distributor](#)
CWS-MCF-STDED-CX

CodeWarrior Development Studio for ColdFire Architectures, Standard Edition

FREESCALE

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[Buy Direct](#)
[Distributor](#)
IC-SW-OPR

winIDEA

winIDEA integrates a Project Manager, Source Code Editor, High and Low Level Debugger, and Flash Programmer, all into one easy-to-use Windows application. It is the one user interface for all of our emulators and debuggers.

ISYS

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MULTI

MULTI

MULTI is a complete integrated development environment for embedded applications for C/C+++, Embedded C++ and includes an advanced debugger, profiler, run-time memory checking, project builder, editor, instruction set simulator and more.

GREENHILLS

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SBCTOOLS-WF

SBCTools-WF, Eclipse Edition

Complete software development tools-set, including GCC, GDB, TCP/IP stack, serial console and target config services, all accessible seamlessly through Eclipse. Includes WildFire BSP with h/w interface libraries and annotated demo programs.

INTEC

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Initialization/Boot Code Generation**ID and Description**

Vendor ID

Format

Size K

Rev #

Availability

COLDFIRE_INIT**MICROAPL**

zip

6

n/a

[Download](#)

MicroAPL Limited's ColdFire Graphical Configuration Tool

Performance and Testing**ID and Description**

Vendor ID

Format

Size K

Rev #

Availability

UNITCFZ_DIST

UNITCFZ_DIST

The UNITCFZ software package consists of an interface DLL and sample code which allows a custom application to be built which can interact with and debug a ColdFire based system via one of P&E's hardware interfaces.

PEMICRO

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Order	Part Number	Package Description	Tape and Reel	Application/ Qualification Tier	Status	Budgetary Price QTY 1000+ (\$US)	Compliance		RoHS Replacement Part	Details
							Package Peak Temperature (°C)	RoHS		
Order Samples Distributor	MCF5216CVF66	MAPBGA 256 17*17*0.8P1.0	No	COMMERCIAL, INDUSTRIAL	Active	\$16.15	260	No	MCF5216CVM66	view
Order Samples Distributor		MAPBGA 256 17*17*0.8P1.0								
Order Samples Distributor	MCF5216CVM66	MAPBGA 256 17*17*0.8P1.0	No	COMMERCIAL, INDUSTRIAL	Active	\$13.02	260		-	view

NOTE:

- Not all orderable parts are offered through our online sampling program. For further assistance in selecting a similar part from within the program, please submit a [Request for a sample order advice](#).
- Refer to Samples FAQ for more information.
- Looking for an obsolete part? Check our new [part number search](#)

[▲ Return to Top](#)**Related Products**[▶ MCF5211 : Integrated ColdFire Version 2 Microcontroller](#)

The MCF5211 microcontroller is a low cost, low power single-chip solution with up to 128KB of high performance, near-single access, interleaved and securable ...

[▶ MCF5212 : Integrated ColdFire Version 2 Microcontroller](#)

The MCF5212 microcontroller is a cost-sensitive, low power single-chip solution with up to 256KB of high performance, near-single access, interleaved and ...

[▶ MCF5213 : Integrated ColdFire Version 2 Microcontroller](#)

The MCF5213 microcontroller is a cost-sensitive, low power single-chip solution with up to 256KB of high performance, near-single access, interleaved and securable ...

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- ▶ [Freescale's Advanced Telecommunications Computing Architecture \(ATCA\)](#)
- ▶ [Industrial Control](#)
- ▶ [CodeWarrior Development Studio Instructions for MCF5214 and MCF5216 Support](#)

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